Amendments to Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (currently amended) A method ~~Method~~ to generate control data sets for the production of metallic and/or non-metallic products ~~(2, 21)~~, in particular dental products or medical products, by freeform sintering and/or freeform melting by means of a high-energy beam ~~(8)~~, in particular a laser beam or electron beam, whereby a product ~~(2, 21)~~ is built up layer by layer ~~(12-15, 20, 22)~~, out of a material ~~(6)~~ to be added layer by layer, by means of a beam ~~(8)~~ guided with the help of a control data set, whereby the method comprises ~~the steps of~~

loading ~~(23)~~ a product target geometry data set, which represents the target geometry of the product ~~(2, 21)~~ to be produced; and ~~, and of~~

generating ~~(25)~~ the control data set on the basis of the product target geometry data set, characterized by ~~the further steps of~~

determining ~~(24)~~ a compensation data set and/or a compensation function to compensate for manufacturing-related effects caused by the sintering and/or melting; [[,]] and

combining ~~(25)~~ the compensation data set with and/or applying the compensation function to the product target geometry data set to generate the control data set.

2. (currently amended) The Method method of claim 1, wherein ~~characterized in that~~ the compensation data set and/or the compensation function is determined in dependence on the a size and the a shape of the product ~~(2, 21)~~ to be produced.

3. (currently amended) ~~The method~~ Method of claim 1 ~~or 2, characterized in that~~ <u>wherein</u> the compensation data set <u>and/</u>or the compensation function is determined in dependence on an angle of inclination ~~(α)~~ of a plane placed tangentially to an exterior surface of the product ~~(2, 21)~~ to be produced relative to a reference plane, in particular a horizontal plane.

4. (currently amended) ~~The method~~ Method of claim 4, <u>further comprising</u> ~~Characterized in that~~

<u>using the compensation data set or the compensation function in dependence on the angle of inclination to reduce a</u> [[A]] thickness ~~(d)~~ of the product to be produced, <u>wherein the thickness is</u> measured perpendicular to said tangential plane. ~~, is reduced by means of the compensation data set or the compensation function in dependence on said angle of inclination (α).~~

5. (currently amended) <u>The method</u> ~~Method~~ of <u>claim 1</u> ~~one of the preceding claims~~, characterized in that the compensation function is continuous and differentiable.

6. (currently amended) <u>The method</u> ~~Method~~ of claim 5, characterized in that the compensation function contains a polynomial of 2nd, 3rd, 4th. and/or higher degree.

7. (currently amended) <u>The method</u> ~~Method~~ of claim 6, <u>further comprising:</u>

<u>   using a plurality of compensation functions for a single product to be produced,</u> <u>wherein the plurality of compensation functions</u> ~~characterized in that for one product several compensation functions are used, which~~ at least partially differ with respect to their degree.

8. (currently amended) <u>The method</u> ~~Method~~ of claim 7, <u>wherein using a plurality of compensation functions includes using</u> ~~characterized in that~~ a polynomial of lower degree ~~is used~~ for simple-geometry regions of a product to be manufactured, ~~while~~ <u>and using</u> a higher degree polynomial ~~is used~~ for complex-geometry regions of a product to be produced.

9. (currently amended) The method ~~Method~~ of claim 1 ~~one of the preceding claims~~, wherein applying the compensation function to the product geometry data set includes applying ~~characterized in that~~ the compensation function ~~is applied~~ to the product geometry data set for only certain regions of the product to be produced.

10. (currently amended) The method ~~Method~~ of claim 9, wherein ~~characterized in that~~ the compensation function is applied to the product geometry data set only for the connecting regions of a bridge to be produced as a dental prosthesis.

11. (currently amended) The method ~~Method~~ of claim 1 ~~one of the preceding claims~~, wherein ~~characterized in that~~ the compensation data set and/or the compensation function are determined with the help of at least one parameter selected from ~~out of~~ a group of parameters consisting of ~~that includes~~:

- ~~the~~ a modulus of elasticity of the material ~~(6)~~,
- ~~the~~ a solidus temperature of the material ~~(6)~~,
- ~~the~~ a thermal expansion coefficient of the material ~~(6)~~,
- ~~the~~ a tensile strength of the material ~~(6)~~,
- ~~the~~ an elastic yield point of the material ~~(6)~~,
- a processing chamber temperature that represents ~~the~~ a temperature in a processing chamber surrounding the material ~~(6)~~ to be processed,
- a processing temperature that represents ~~the~~ a temperature of ~~the~~ a region of the material ~~(6)~~ irradiated by the beam ~~(8)~~,
- a layer thickness ~~(d)~~ that represents ~~the~~ a thickness of a material layer ~~(12-15, 20,22)~~ that has been or is to be applied,
- ~~The~~ a power of the beam source, ~~in particular of the laser (7) or the electron beam source, or~~ the a power of the beam, ~~in particular the laser beam (8) or the electron beam,~~ during ~~the process of~~ sintering or melting,
- ~~The~~ a traverse rate of the beam ~~(8)~~,
- ~~The~~ an irradiation strategy,
- ~~The~~ a geometry of the product ~~(2, 21)~~ to be produced,

- The ~~a~~ height of the product (2, 21) to be produced, and
- The ~~a~~ type of possible secondary treatment of the product (2, 21) after ~~the~~ sintering or melting.

12. (currently amended) The method ~~Method~~ of claim 1 ~~one of the preceding claims~~, further comprising:

optically scanning, during or after irradiation of a material layer, a contour already created or being created of the product, wherein the optical scanning generates an optical scanning data set;

comparing the optical scanning data set to the product target geometry data set to detect a deviation; and

if a deviation is detected, correcting the control data set in accordance with the detected deviation.

~~Characterized in that~~

~~During and/or after the irradiation of a material layer (12-15, 20, 22), a contour already created or being created of the product (2, 21) is optically scanned and the measurement data obtained in this manner are compared to the data of the product target geometry data set, and that in the event of a detection of a deviation, the control data set is corrected in accordance with the detected deviation.~~

13. (currently amended) Device for generating control data sets for the production of metallic and/or non-metallic products (2, 21), in particular dental products or medical products, by freeform sintering and/or freeform melting by means of a high-energy beam (8), in particular a laser beam or electron beam, ~~and for carrying out a method of one of claims 1 to 12~~, whereby a product (2, 21) can be built up layer by layer, from a material to be applied layer by layer, by means of said beam (8) guidable with the help of a control data set.

Whereby the device (11) comprises

- means for loading (23) a product target geometry data set that represents the target geometry of the product (2, 11) to be produced, and

- means for generating (25) the control data set on the basis of the product geometry data set,

characterized by

- means for determining (24) a compensation data set and/or a compensation function to compensate for manufacturing-related effects caused by the sintering and/or melting, and
- means for combining (25) the compensation data set with and/or applying the compensation function to the product target geometry data set to generate the control data set.

14. (currently amended) Apparatus for the production of metallic and/or non-metallic products (2, 21), in particular dental products or medical products, by freeform sintering and/or freeform melting by means of a high-energy beam (8), in particular a laser beam or electron beam, whereby the apparatus comprises:

[[-]] a beam source (7), in particular a laser or an electron beam source, for generating said beam (8),

[[-]] a platform (4) to hold a material (6) to be deposited in layers,

[[-]] a control system (11), including a device in accordance with claim 13, for controlling the beam (8) that is data-driven to guide the beam (8) to build up a product from the a material (6) layer by layer. (12-15, 20, 22),

Characterized in that

The control system (11) comprises a device for the generation of control data according to claim 13 for guiding the beam (8).